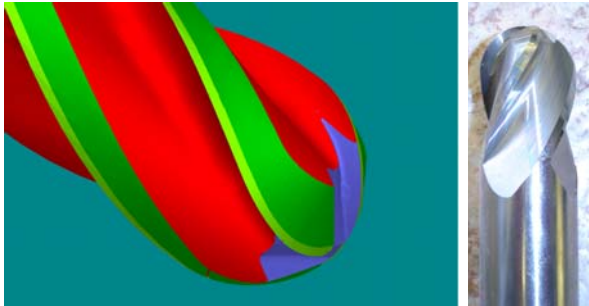


Application Data Sheet

Ballnose Endmill

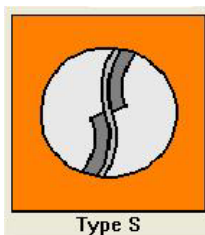


Ballnose Endmills are among the most commonly and extensively used cutting tools on CNC milling machines and machining centers. They are essential for production of sculptured surfaces required on component such as dies and moulds. Normally, solid high-speed steel or solid carbide cutters are used.



1 Grinding Technology

Ballnose Endmills made on Schneeberger Grinding Machines fulfill the requirements of Tool manufacturer to reduce costs, increase productivity of CNC milling of sculptured surfaces, reduction of cutting time and improvement of surface finish.



The Quinto Software improves the manufacturer to grind the important S-Form on Type S in a perfect way within tight tolerances. The Type NAS requires to grind the Gashing and the Flute operation in one shot. Quinto takes care, if chosen, of this requirement. A unique possibility

offers Quinto by enable the tool manufacturer to do single correction points on the Radius of the Ballnose.

Further the Software is ready to grind many other different Types.

Quinto Software developed in House

- The Ballnose Endmill can be produced and reground with the QUINTO software package Tapered Endmills and Tapered Ballnose Endmills.
- The Radius and O.D. are ground in one operation.
- The Radius part is executed in a 5 or 4 axes interpolation, depending on the type selected.

Wheels: Standard qualities can be achieved using a grain size of D64 a better with D30-46 and a concentration of 100.

2 Tool Characteristics

Length: Select an end mill as short as possible to minimize tool deflection during the milling operation. Select stub lengths, if possible, to save on tool cost.

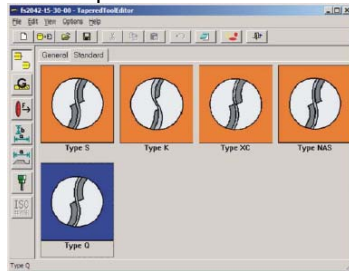
Number of Flutes: Generally, more flutes reduce chip load and improves surface finish if feed rate remains the same. The most common flute numbers for general milling operations are two (maximum space for chip ejection) and four (better surface finish).

Rake Angle: End mills typically have a 10-12 degree positive rake angle. This allows for efficient cutting performances of soft, gummy materials as well as materials with high tensile strength. Depending on the material to be machined, it is possible to change the rake angles. Used in conjunction with variation of rake, clearance angles can be altered to provide added support and strength directly behind the cutting edge.

Helix Angle: The standard helix angle of an end mill is usually 30°. Higher helix angles provide better chip ejection and are useful in machining materials such as aluminum at a much faster rate.

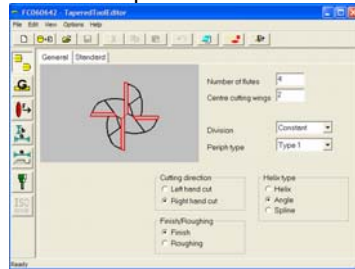
3 The easiest way to program the tool

First Step



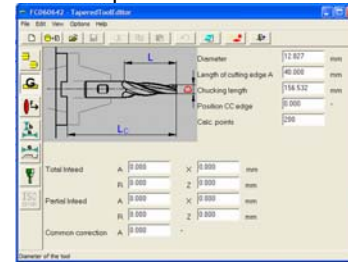
Select one of the Face Types

Second Step



Give in the number of flutes and Center Cutting Wings

Third Step



Please define the Diameter and length of cutting edge

Forth step

Use the Data Base to compiled the Program

Any individual changes on the geometry can be made in the Quinto register.

4 Cycle time for production

Tool specification

Diameter: 20mm, Cutting edges: 2, Length cutting edge: 39mm, Helixangle: 30deg and Material: HM

Operations		Flute 1	Flute 2	Gashing 1	Center Cutting	O.D. 3	O.D. 2	O.D. 1
Feed [mm/min]	2000	60	90	100	120	200	150	300
Power [kW]		4	3	2	1	1	1	1
Cutting speed [m/s]		16	16	24	24	24	24	24
Wheels								
Grinding time [s]	23	101	71	102	35	143	187	100
Total cycle time [s]	12 Min 41s							

The mentioned cycle times are indicative. The material to be ground, other grinding wheels and other coolants can influence the cycle times considerably.

Machine and Software Requirements

Machines: 5 axes CNC grinders : CORVUS GDS, GEMINI, NORMA CFG

Control: Fanuc 160i

Coolant: Water soluble, pressure 6 – 7 bar

Software: Quinto NT

www.schneeberger.ch

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